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Determination of carbon nanotube wall thickness and elasticity by atomic force micrsocopy. TRISTAN DEBORDE, CALEB JOINER, MATTHEW LEYDEN, ETHAN MINOT, Oregon State University — To understand the operation of carbon nanotube (CNT) devices it is important to determine whether nanotubes are single-walled or multi-walled. Transmission electron microscopy of CNTs has previously been the only tool available to count the number of graphene sheets forming the wall of a CNT. We show that atomic force microscopy can measure CNT wall thickness by squeezing individual nanotubes between a tip and a hard surface. Full compression of single-walled and double-walled CNTs can be achieved either by a static force or by ac-mode imaging, allowing clear determination of wall number. Direct measurements of compression forces are used to determine the elastic properties of the wall, yielding the bending modulus of graphene.

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